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Abstract

A semiconductor device which comprises a semi-insulating substrate (1) and a plurality of field effect transistors (FETs) formed on the semi-insulating substrate (1). An epitaxial layer (2) of one conductivity type is formed on the semi-insulating substrate by a crystal growth technique which is capable of controlling a film thickness at an atomic level. At least some of channel active layers of the FETs have different threshold voltages one another due to a difference in thickness of the epitaxial layer (2) and/or due to an additional ion implantation region selectively formed in the epitaxial layer (2). A manufacturing method of the semiconductor device is also disclosed, wherein a portion of the epitaxial layer (2) corresponding to the channel active layer of a FET is thickened by the repetition of an epitaxial growth, thinned by the etching of the epitaxial layer or ion implanted thereby obtaining a different threshold voltage from that of another FET.